

We Claim:

1 1. An energy recovery system of the type wherein heat is extracted from
2 an engine by refrigerant passing through an heat exchanger of an organic rankine
3 cycle system, comprising:
4 a heat exchanger for transferring heat from said engine to an organic rankine
5 cycle fluid flowing through said heat exchanger;
6 a turbine for receiving said heated fluid from said heat exchanger and for
7 transferring a thermal energy to motive power, with said fluid being cooled in
8 process;
9 a condenser for receiving said cooled fluid and for further cooling said fluid
10 to cause it to change to a liquid state;
11 a circulation means for receiving said liquid refrigerant and circulating it to
12 said heat exchanger;
13 wherein said heat exchanger is adapted to transfer heat from a plurality of
14 sources within said engine.

1 2. A system as set forth in claim 1 wherein said heat exchanger is
2 adapted to conduct the flow of two different engine fluids therethrough.

1 3. A system as set forth in claim 2 wherein said heat exchanger is so
2 adapted as to have engine coolant passing therethrough.

1 4. A system as set forth in claim 2 wherein said heat exchanger is so
2 adapted as to have engine lubricant passing therethrough.

1 5. A system as set forth in claim 2 wherein the flow of said two
2 different engine fluids is in the same direction through said heat exchanger.

1 6. A system as set forth in claim 5 wherein said ORC flow is in a
2 direction opposite to said two different engine fluid flows.

1 7. A system as set forth in claim 2 wherein the temperature of said two
2 different engine fluids are in the range of 160 to 200°F.

1 8. A system as set forth in claim 2 wherein said two different engine
2 fluids comprise an engine coolant and an engine lubricant.

1 9. A method of operating a waste heat recovery system having an
2 organic rankine cycle with its motive fluid in heat exchange relationship with
3 relatively hot fluids of an engine, comprising the steps of:
4 circulating a relatively cool motive fluid from a condenser of said organic
5 rankine cycle through at least one heat exchanger;
6 circulating a plurality of relatively hot fluids from said engine through said
7 at least one heat exchanger to thereby heat said motive fluid and cool said plurality
8 of fluids;
9 circulate said heated motive fluid through a turbine for providing motive
10 power thereto while cooling said motive fluid;
11 circulating said cooled motive fluid to said condenser; and
12 circulating said plurality of cooled engine fluids back to said engine.

1 10. A method as set forth in claim 9 wherein said step of circulating a
2 plurality of relatively hot fluids includes the step of circulating engine coolant
3 through said heat exchanger.

1 11. A method as set forth in claim 9 wherein said step of circulating a
2 plurality of relatively hot fluids includes the step of circulating engine lubricant
3 through said heat exchanger.

1 12. A method as set forth in claim 9 wherein said step of circulating a
2 plurality of relatively hot fluids includes the step of circulating an engine coolant
3 and an engine lubricant through said heat exchanger.

1 13. A method as set forth in claim 12 wherein said engine coolant and
2 engine lubricant are made to flow through the heat exchanger in the same direction.

1 14. A method as set forth in claim 13 wherein said step of circulating
2 said relatively cool motive fluid is accomplished by causing said motive fluid to
3 flow in a direction opposite to the flow of said engine coolant and engine lubricant.